



Nathan Schumaker &lt;[REDACTED]&gt;

## NSO demography data and Hexsim parameters

2 messages

Carlos Carroll &lt;carlos@klamathconservation.org&gt;

Wed, Oct 6, 2010 at 1:24 PM

To: Robert Anthony &lt;robert.anthony@oregonstate.edu&gt;, Nathan Schumaker &lt;[REDACTED]&gt;

Bob and Nathan - I'm starting to write up peer review comments on the 2010 draft NSO recovery plan and I had some questions about parameterization of the Hexsim scenarios that you may be able to help with. Following the September 16th Ashland workshop, I followed up with Nathan on a question Marty Raphael brought up: why didn't one or more Hexsim scenarios include an influence of habitat on fecundity? This prompted me to read the new metaanalysis (Forsman et al. in press). If one based the Hexsim parameterization on the meta-analysis results, they would suggest a habitat effect on fecundity, but not on survival, the opposite of the parameterization used currently in the Hexsim scenario.

Forsman et al. : "The percent cover of suitable owl habitat was in the top fecundity model for all study areas in Oregon, and in competitive models for two of the three study areas in Washington...Habitat effects were not included in models for study areas in California, because we did not have a comparable habitat map for those areas."

"There was no evidence that ownership category, percent cover of suitable owl habitat, or latitude had an effect on apparent survival."

I would be the first to admit that it is not a simple question how to reconcile or integrate the metaanalysis results within Hexsim simulations, for at least several reasons:

1) Populations in most parts of the NSO range show declines ("populations on four study areas declined 40-60% during the study, and populations on three study areas declined 20-30%") yet many aspects of SEPM simulations that respond to stochastic factors (eg, distinguishing effects of size and spacing of habitat clusters) are swamped when such rapid deterministic declines are modeled.

2) Models of NSO distribution typically show strong correlations with habitat, whereas analyses of demographic data typically show weak or no correlation. Since distribution ultimately arises from demography, how to reconcile these two types of analyses is an unsolved question in my view.

3) If one parameterized Hexsim, drawing from the metaanalysis, with no habitat influence on survival, one would be left with something approximating a simple (and uninformative) model that demonstrated that other effects, primarily barred owls under the current assumptions, were leading to declining NSO populations. It obviously doesn't require a complex model to justify barred owl removal, and so this seems a poor modeling strategy to follow.

The only strategy I can think of is to compare Hexsim scenarios with a range of parameter sets (eg, 1) equilibrium vs. declining populations, and 2)

habitat effects on survival only, fecundity only, and on both parameters), and see if general insights emerge that can inform planning. Marty made the related point that it was necessary to include a least one scenario that tried to closely mimic the rates from the metaanalysis, maybe the Baseline scenario is already doing that but the population declines don't seem steep enough to reflect that.

But I know you two have talked over these issues in order to create the NSO Baseline scenario, so I'm probably missing some aspects of this question that you've already considered, and our discussion of this would help make my peer review comments better.  
Thanks in advance.

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Carlos Carroll, Ph.D.  
Klamath Center for Conservation Research  
PO Box 104  
Orleans, CA 95556

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**Anthony, Robert G - FW** <robert.anthony@oregonstate.edu>

**Fri, Oct 8, 2010 at 4:51 PM**

To: Carlos Carroll <carlos@klamathconservation.org>

Cc: Nathan Schumaker <[REDACTED]>, Brian Woodbridge <Brian\_Woodbridge@fws.gov>, "Brendan\_White@fws.gov" <Brendan\_White@fws.gov>, "Bruce G. Marcot" <brucem@spiritone.com>, Marty Raphael <mraphael@fs.fed.us>

Carlos:

I will try to answer some of your questions to the best of my recollection.

The modeling of resource availability/habitat on fecundity was a bit problematic for several reasons. First, as you note we did not have a comparable map and habitat assessment for California in the meta-analysis, so no results or conclusions for that portion of the owl's range. Second, the habitat covariate was not significant in the best models for Washington as all of the confidence intervals overlapped zero considerably, even habitat was in the best models for these study areas. For Oregon, the confidence intervals for the habitat covariate were positive and did not overlap zero so those effects were significant and positive. Consequently, the effects of habitat amount on fecundity were mixed and not very conclusion from the meta-analysis, which provided a considerable challenge in how to model such effects in HexSim.

The decision to model the effects of habitat on survival were based to some extent on the fact that populations are most sensitive to changes in adult survival rates, not the results from the meta-analysis. In order to model the effects of habitat on survival we used other published literature (Franklin et al. 2000, Olson et al. 2004, Dugger et al. 2005) to justify these effects. All of these modeling efforts found a significant effect of the amount of old forest around nest sites on survival rates, so we used the range of survival values from the meta-analysis to represent the "potential" effects of the amount of habitat on survival. I believe that this approach is reasonably justified by the above articles but it could be criticized because it was not a direct transferal of model results to the modeling effort.

Yes, models of spotted owl distributions are highly correlated with habitat quantity and quality, which is based on the location of known or historical nest sites (your comment #2). This is what is to be expected but it does not infer the relation of fecundity or survival to habitat. Yes, the baseline models of HexSim do attempt to mirror the results of the meta-analysis as the models is based on the parameters from the meta-analysis. The degree to which the results are comparable varies among the provinces as one would expect.

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Lastly, I think that your suggestions to model the effect of habitat on fecundity only, then survival only, then both parameters has some merit. This should be the topic of some discussion among the modelers in the HexSim and Maxent efforts. Any thoughts from the rest of you?

I hope this helps explain a few things for you. Some of this detail needs to be included in the writeup of the description of the modeling effort.

Bob

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